"ELIMINATION OF ACQUIRED DEFECTS OF THE MAXILLOFACIAL AREA USING 3D IMPLANTATION"

Fattayeva Dilorom Rustamovna
Buriyeva Dilnavoz Uktam qizi
Galiyeva Nazokatxon Gayratovna
Kamalbaeva Mushtariy Alimardon qizi
(teacher and students)
«Alfraganus university»
https://doi.org/10.5281/zenodo.8157760

Annotation. The article considers the problem of combined facial trauma as a high-level diagnostic and surgical challenge, in particular the lower orbital wall. The article presents the results of clinical observation and describes the peculiarities and consequences of its manifestation.

Keywords: orbital reconstruction, maxillofacial surgery, orbital floor, reconstruction, trauma, face.

3D bioprinting is an area in which 3D printing technology is used to manufacture biomedical objects. The new technology is needed for scenarios in which a certain part of the bone has been removed or destroyed. This method is the first of its kind that can create a structure that accurately mimics the physical and biological features of native human bone tissue.

Objective: To determine a more optimal option for surgical treatment of fractures and bone defects of the maxillofacial region

Tasks:

- To develop the exclusion of medical errors during implantation of the implant;
- Maximum accuracy of implant placement;
- To improve the reduction of the stages of surgical intervention
- Evaluate the effectiveness of 3D implantation, without creating a secondary injury, without risks of infection, pronounced swelling and pain;

3D printing technology is also known as "additive technology", since during the production of an object, the material is built up layer by layer.

Methods of restoration of defects in the maxillofacial area using 3D printing

Bioprinting

- Most bioprinters also supply some kind of organic or synthetic "glue"-a soluble gel or collagen scaffold to which cells can attach and grow.
- Then this part of the bone is covered with adult stem cells that can develop into almost any other type of cell.
- This is combined with bio-ink from the printer — a combination of polylactic acid (which provides mechanical strength of the bone) and alginate — a gel-like substance that serves as a cushioning material for cells.

Then the final product is implanted into the body

In order to shorten the operation time and reduce the risk of complications. Before the operation, a 3D model is made, according to which the operation is planned.

IBAST | Volume 3, Issue 7, July

After partial removal of the skull bone, according to a series of tomograph images, a 3d model of the skull was made, after which a reconstruction of the missing part of the cranium was made, then a titanium plate was formed from the printed missing part to close the bone defect

To create a 3D model of the implant, MSCT is done. Then the developers perform a computer simulation of the future implant. A mathematical three-dimensional model of the structure is created, which allows you to optimize the design according to the necessary criteria. Next, a file with an extension suitable for the printer is created, the model is divided into layers and materialized by layer-by-layer build-up

Figure 1: A model of the lower jaw of a patient after surgery in oncology

Several larger comparative studies have demonstrated a positive effect of (components of) CAS on the accuracy of volumetric reconstruction [62], clinical outcomes [36], and the need for revision surgery [63]. In practice, a combination of several CAS components is often used. This leads to heterogeneity of surgical approaches, which makes it difficult to compare results between studies. Differences in indications, patient and fracture characteristics, and implant materials used further complicate the comparison [64]. Determining the effect of individual CAS techniques on patient outcomes is difficult because of the overlap between the techniques in the groups studied. Individual effects of CAS techniques have been evaluated in a one-to-one comparison on a series of cadavers [65]. Despite the limitations of the cadaveric model and the inability to estimate clinical outcome parameters, a positive effect of virtual planning, intraoperative imaging, and surgical navigation on reconstruction accuracy was found.

The best solution to achieve an optimal result [78] and in the future can be accurately adapted to the individual patient, provided the above knowledge gaps are filled. Cost, turnaround time, and logistical requirements are disadvantages of using PSI. Pricing.
can vary depending on geography, but typically the process costs between 1,500 and 6,000 euros. Making the implant takes about 3-5 business days; this amount does not include sterilization or the time required for virtual surgery planning and design. Korn et al. described

the average communication time between the surgeon and the PSI technician during virtual surgical planning, which was nearly nine days for isolated wall fractures and 16 days for multi-wall fractures [82]. Adjustments to the original design proposed by the technician were required in nearly three-quarters of cases, but implants placed by technicians trained by the company required fewer adjustments. Improved communication and understanding are believed to be the reasons for the increased efficiency. Complete in-house planning and design by a dedicated technician on site can improve planning efficiency and ultimately significantly reduce preparation time (assuming the surgeon and technician are experienced and have collaborated on previous cases). In-house design is supposed to reduce costs because the commercial partners rely only on production. These advantages of in-house design may be why surgeons using in-house planning feel less of the disadvantages of using PSI .

Although this paper focuses on posttraumatic orbital reconstruction, other orbital-related applications of PSI have also been described. In cheekbone reconstruction after trauma, ablative surgery or congenital deformity, PSI has been found to accurately restore anatomy without the need for additional bone grafts. In secondary posttraumatic reconstruction of the orbit and zygomatic bone, PSIs allow for a one-stage surgical procedure in which the order of operations is reversed: if the orbit is operated on first, the functional result of orbital reconstruction does not depend on repositioning of the zygomatic complex [54]. PSIs can also be used to create an artificial rim and orbital floor to support the globe after maxillectomy [84,85]. The most extensive orbital reconstructions using PSI have been described after resection of a spheno-orbital meningioma or neurofibroma . In these cases, reconstruction of all four orbital walls with multiple PSIs allowed predictable reconstruction of the internal orbital structure under the same surgical conditions as the resection. The design of PSI in the aforementioned cases may differ significantly from that of posttraumatic reconstruction of single orbital fractures. Nevertheless, the point of using PSI is the same: freedom of design to adapt PSI to the patient's anatomy and a predictable and accurate end result.

References:

1.Fattaeva, D., Muxtorov, I., Rustambekov, B., & Polotxanov, M. (2023). EVALUATION OF CLINICAL EXAMINATION RESULTS. POST-OPERATIVE CONDITIONS. International Bulletin of Medical Sciences and Clinical Research, 3(5), 213-216.

2.Fattayeva, D., Xoliqov, A., & Yusupova, I. (2023). FEATURES OF SURGICAL TREATMENT OF WISE TOOTH PERICORONITIS. International Bulletin of Medical Sciences and Clinical Research, 3(7), 10-14.

3.Alimurodovich, K. A., Rustamovna, F. D., Abrorjonovich, S. E., & Hamraevna, S. K. (2023). Materials and methods of clinical research. Texas Journal of Multidisciplinary Studies, 20, 73-76.

4.Fattayeva, Dilorom, Eldor Shermatov, and Kamola Shermatova. "THE EFFECTIVENESS OF THE TREATMENT OF ABSCESSES AND PHLEGMON USING CHLORHEXIDINE." International Bulletin of Medical Sciences and Clinical Research 3.5 (2023): 161-164.

5.Alimurodovich, Khalikov Azizbek, and Rakhmatov Jakhongir Bakhodirovich. "COMPARATIVE CHARACTERISTICS OF MFR PLASTIC OPERATIONS." American Journal of Technology and Applied Sciences 7 (2022): 34-38.

6.Фаттаева, Д. Р., Ризаев, Ж. А., Рахимова, Д. А., & Холиков, А. А. (2021). CLINICAL PICTURE OF SINUSITIS IN PATIENTS AFTER COVID-19 WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE. УЗБЕКСКИЙ МЕДИЦИНСКИЙ ЖУРНАЛ, 2(2).
7.Urunbaeva, S. S., Alishakhi, L. S., Pirmatov, M. A., & Fattayeva, D. R. (2022). OPTIMIZATION OF TREATMENT OF PATIENTS WITH PHLEGMON OF THE MAXILLOFACIAL REGION. British View, 7(4).
8.Mamadrizaeva, Z. F., Rakhmatova, S. S., Yunusov, A. A., & Fattayeva, D. R. (2022). FEATURES OF THE TREATMENT OF FRACTURES OF THE ZYGOMATIC-ORBITAL COMPLEX. British View, 7(4).
9.Urunbaeva, S. S., Pirmatov, M. A., Nosirov, S. S., & Kholikov, A. A. (2022). COMPARATIVE CHARACTERISTICS OF THE TREATMENT OF MANDIBULAR FRACTURES. British View, 7(4).
10.Olimjonov, T. A., Fattayeva, D. R., & Umarov, J. A. (2022). Treatment methods for fractures of the zygomatic-orbital complex. Periodica Journal of Modern Philosophy, Social Sciences and Humanities, 13, 65-68.
11.Shamov, V. V., Kholikov, A. A., & Fattayeva, D. R. (2022). Improvement of treatment methods of combined traumas of maxillofacial region. Periodica Journal of Modern Philosophy, Social Sciences and Humanities, 13, 56-61.
12.Холмурадов, Ж. Р., Холиков, А. А., & Фаттаева, Д. Р. (2022). МЕТОДЫ ОБСЛЕДОВАНИЯ БОЛЬНЫХ С ФЛЕГМОНАМИ ЧЕЛЮСТНОЛИЦЕВОЙ ОБЛАСТИ. Central Asian Research Journal for Interdisciplinary Studies (CARJIS), 2(12), 97-101.
13.Alimurodovich, K. A., & Rustamovna, F. D. (2023). Differential Diagnosis of Facial Pain. Research Journal of Trauma and Disability Studies, 2(4), 36-42.